Cleaning and Disinfection

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Outline

• Introduction
• Steps for cleaning and disinfection
• How to choose
• How to evaluate disinfectant
How do we reduce pathogens?

1. Increase immunity
2. Decrease exposure

Most poultry health professionals will agree that for total bird health, you should **always do both**

Terminology

**Cleaning**
Removal of all animal matter, manure, litter, refuse from a place or thing, soil and any other contaminated material that cannot be disinfected.

**Disinfection**
The application, after thorough cleansing, of procedures intended to destroy the infectious or parasitic agents of animal diseases including zoonoses; this applies to premises, vehicles and different objects which may have been directly or indirectly contaminated. (OIE)

Decontamination is a more appropriate term to apply to premises
Terminology (cont.)

**Sterilization** — processes to destroy all microbial life including spores

**Disinfectants** — chemical compounds applied to inanimate (non-living) objects to destroy or irreversibly inactivate disease-causing organisms.

**Antiseptic** — chemical compounds used on living tissue to inactivate disease-causing organisms to a level determined to be safe.

**Sanitizer** — chemical compounds that reduce but do not completely eliminate the number of organisms on inanimate objects (usually refers to vegetative bacteria only).

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Cleaning and Disinfection

**Ideally**

— Completely eliminate and/or inactivate the pathogenic agent, sources for its harbourage and carriage on premises declared infected

**Practically**

— Reduce the risk of disease transmission on and from an infected place
  * Reduce pathogen numbers
  * Reduce infectivity
  * Reduce survivability
C&D Steps

1. Cleaning
   1. Pre-cleaning / dry clean
   2. Foaming and soap
   3. Pressure rinsing
   4. Drying

2. Application of disinfection

3. Downtime
   *Must remove biofilms!*

Remember: **YOU CANNOT DISINFECT DIRT!**

Preparation

- Turn fans off
- Disconnect electricity
- Remove sensitive equipment
- Alternative electrical supply for C&D equipment and lighting
Vectors

• To avoid transfer of pathogens
  – Detect and remove disease vectors
  – Seal rodent entrances
  – Remove and prohibit wild bird nesting areas
  – Eliminate insect breeding areas

Basic Protocol

• Systematic manner
  – Start at back and work toward front
  – Start at ceiling and work down walls
  – Small sections at a time
  – Work toward the drain

• Use marking tape to indicate completed areas
Dry Clean

- Use brooms, shovels, brushes, scrapers
- Moisten to control dust
- Remove
  - Visible organic material
  - Washable items
  - Rotten wood fixtures
- Scrape windowsills, floors
- Dispose of debris in biosecure manner

Wash and Rinse

- Wash area with detergent using sprayer, scrub brush
  - Avoid high pressure if highly contagious
- May need pre-soaked
- Scrubbing may be necessary
- Steam
  - Effective for cracks, crevices, pipework
- Rinse with clean, warm water
- Allow to dry (overnight)
Application of Chemical Disinfectant

- Start application from the top and work down to the floor
  - Make surfaces “shiny wet” (not just damp) for at least 10 min.
  - Porous surfaces require more disinfectant
- Close and lock the barn when done
- Allow sufficient contact time for the disinfectant to work
  - At least 1 hour
  - Make sure all surfaces are dry before preparing for new birds
- Ventilate the barn well before repopulating.
- You can monitor the C&D by taking environmental samples for bacterial counts

Building Exterior

- Width may vary
  - May be as wide as 10 feet
- Flame gun
  - Tip: Wet surfaces prior to distinguished areas treated
- Fan inlets
  - EPA-registered disinfectant with low pressure sprayer
Downtime

- Free of any animals or activity
- Reduces pathogens by drying
- Block of area
Microorganism Considerations

**Most Resistant**
- Coccidia and other parasite eggs
- Bacterial spores (i.e. Clostridium)
- Acid-fast bacteria (i.e. avian tuberculosis)
- Fungal spores
- Non-enveloped viruses (Reo, IBD, AE)
- Chlamydia
- Enveloped viruses (i.e. AI, NDV, LT)
- Gram-negative bacteria (i.e. Salmonella, E. coli)
- Gram-positive bacteria (i.e. Erysipelas, Staph.)
- Mycoplasmas

**Most Susceptible**

Cleaning agents

There are two basic types of detergents that can be used:

- **Alkaline-based** detergents that remove proteins and fats
- **Acid-based** detergents that remove mineral deposits like scales.
Disinfectants

• Physical
  – Heat
  – Light (sunlight, ultraviolet lamps)
  – Radiation (microwave, gamma radiation)
  – Impact (sonication, explosive)

• Chemical
  – Acid
  – Alkalis
  – Alcohols
  – Quats
  – Phenols
  – Aldehydes
  – Oxidizing agents
  – Hypochlorites
  – Iodophores

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C&D Non-metal Materials

- Rubber and plastic may interact with chemical disinfectants
  - Heat can melt plastics
  - Phenols absorbed by plastics
  - Avoid sodium hydroxide (NaOH, caustic soda, lye)
  - Iodophors may stain and corrode
  - Alcohol can swell and harder rubber
- Concrete: porous, do not rinse
  - Flame guns
- Wood: extremely porous, do not rinse with plain water
  - Disinfectant registered for wood or exempted pesticide
- Soil: cannot be disinfected

Good Practices

- Read chemical labels thoroughly and the MSDS (Materials Safety Data Sheet)
- Always wear protective equipment (clothing, mask, eyewear)
- Apply the disinfectant to a dry surface
- Prepare the disinfectant solution based on the total area to be treated
- Use the concentration provided by the manufacturer
  - More is not necessarily better
  - Do not mix disinfectants
How to sample

- Large surfaces: sponge and 30 cm² template
- Small surfaces: swab and 5 cm² template
- Environmental swabbing How-To
  http://www.youtube.com/watch?v=tXXkSHbL8DE
- May need to use neutralizing agent

Conclusions

- Steps for effective C&D
  - Preparation
  - Dry clean (elbow grease) is 80% of the effort
  - Provide contact time of disinfectant
- Choose correct disinfectant
  - Good practices
  - Evaluation